

Energy & Agriculture

The background of the slide is an abstract composition of glowing, ethereal lines in shades of yellow, orange, and red, set against a dark background. These lines create a sense of dynamic energy and movement. A solid red vertical band is on the left side, and a solid orange vertical band is on the right side.

Arizona Department of Agriculture
Agricultural Consultation and Training

This publication is a creation of the On-Farm Energy Audit Implementation Program.



The On-Farm Energy Audit Implementation Program is a coordinated effort between the Arizona Department of Agriculture's Agricultural Consultation and Training Program, the United States Department of Agriculture, Natural Resources Conservation Service, and the Arizona Governor's Office of Energy Policy.

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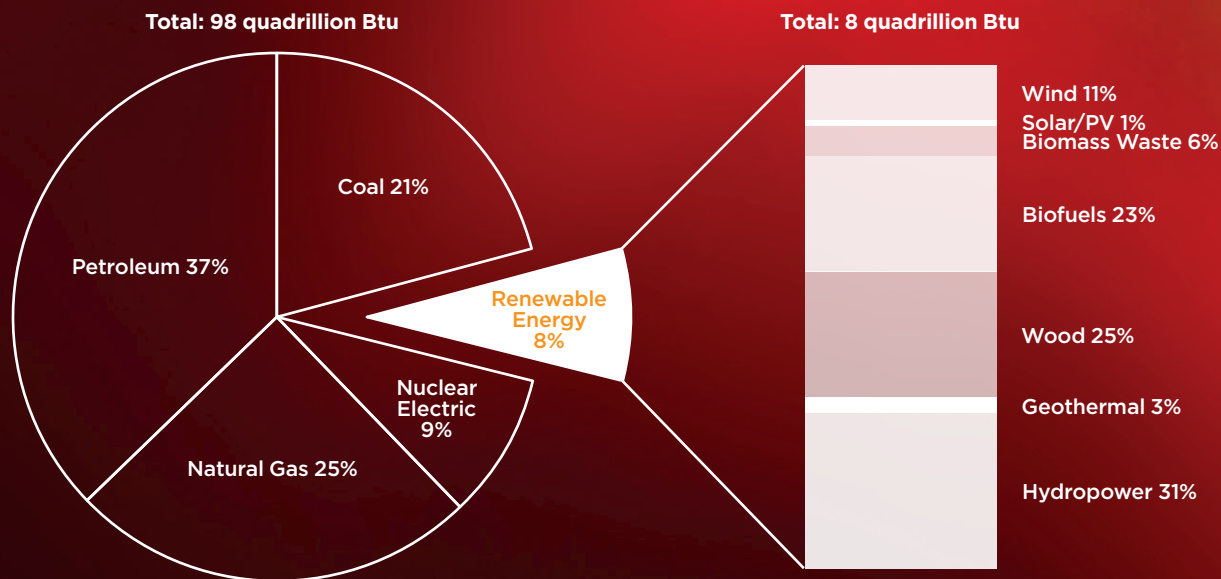
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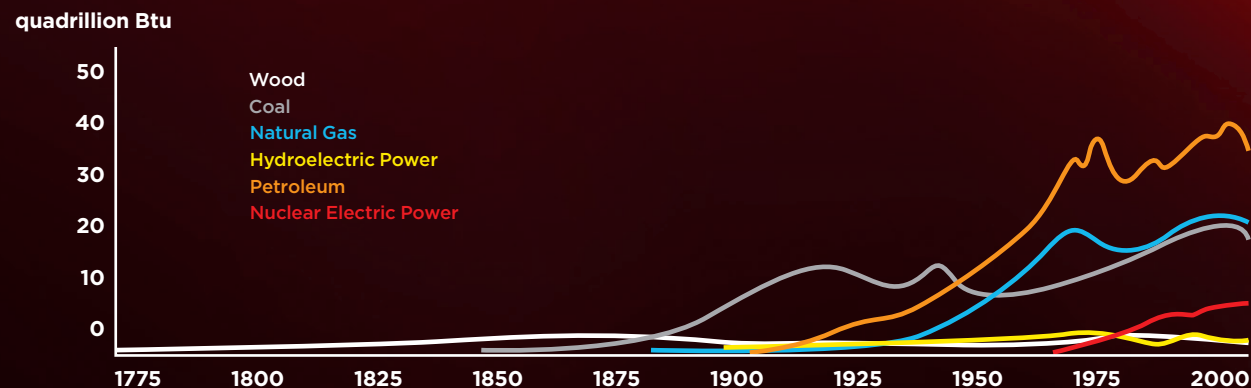
Renewable Energy as Share of Total Primary Energy Consumption in 2010

Source: Annual Energy Review 2010



Primary Energy Consumption by Source, from 1775-2009

Source: Annual Energy Review 2010



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DISTRICT 23

Arizona House of Representatives Phoenix, Arizona 85007

November 4, 2011

Arizona's Agricultural Producers:

I would like to voice my complete support for an energy audit on the farmsteads of Arizona. Farms use all types of energy – liquid, gaseous petroleum and electricity being the most notable – to produce food and fiber for our nation and the world. Conservation as the result of an audit can produce instant rewards in the form of cost savings for the operation and long-term benefits for the nation, when coupled with other energy saving measures in the form of reduced costs in developing new sources of energy and the construction of power plants.

The benefit of having another pair of eyes can reveal, among other things, how energy is being lost, what units are operating efficiently and what cost-effective improvements can be implemented, without reducing the production of the farm.

It is my hope that a whole farm audit will be the result and that the energy auditor will utilize billing history and visual and diagnostic testing, to generate a computer analysis of potential savings for each operation.

Very truly yours,

A handwritten signature in black ink, appearing to read "Frank Pratt", written in a cursive style.

Frank Pratt
State Representative, District #23

Energy Efficiency Opportunities for Agriculture in Arizona

From: Arizona Governor's Office of Energy Policy

Myth

Energy companies are not investing in clean reliable energy.

Reality

Energy companies are making large investments to develop cleaner and more reliable sources of energy. According to a 2007 report compiled by the US Department of Energy, U.S.-based oil and gas companies have invested an estimated \$121.3 billion on emerging energy technologies in the North American market. Another \$58.2 has been invested by other private industries including agriculture.



In Arizona farming, dairy, greenhouse and ranching operations, energy is used to power heating and cooling systems, turn ventilation fans, light internal and exterior spaces, pump water over long distances, run compressed air systems to power tools and the heating or cooling of liquids. With long hours of operation, there can be significant energy and dollar savings opportunities. Let's take a look at the possibilities.

Moving Water from Here to There: Energy Used by Motors and Pumps

Significant energy use occurs from the pumping of ground water and the moving of water via irrigation. The energy source is typically grid electricity, site generated electricity or pumps powered by gasoline or diesel fuels, natural gas or propane. The first opportunity is with the motors or pumps. If the equipment is old, or has not been well maintained, it could be operating at an inefficient level and causing high utility costs. Replacing the old equipment could be very cost effective. Because of year to year advances in technology, the new equipment will be more efficient. Here is where the second opportunity occurs. When replacing the existing equipment, it is a good time to determine the appropriate sizing for the new equipment. Have the needs changed? Is it time to increase the system's capacity, or, downsize the system to better match the load? It's common to find that the original system was sized for the very worst of conditions. If it is a constant speed system, there are probably times during the year when less than full output is needed. Proper sizing can optimize the energy performance of the motors or pumps. And having the ability to adjust

speed by installing a two-speed system or variable-speed system can greatly reduce energy costs.

Electric motors. If the motors drive other pieces of equipment with a belt(s) or pulleys, there is an opportunity to reduce their operating costs by replacing worn belts or worn sheaves, ensure proper belt tension and sheave alignment and convert to notched belts. As motors age, their efficiency can drop significantly. If the motor is used over 2,000 hours a year switching from an old, standard efficiency motor to a premium efficiency motor would improve efficiency.

Clearing the Air: Ventilation Systems

Whether it is an enclosed space that needs to bring in fresh air for circulation, or an open space needing air circulation for animal comfort, the energy used places a burden on the operating costs. Similar to the energy used for motors and pumps, there is the opportunity to replace existing equipment with more efficient equipment. Does the need for ventilation vary by time of day, load or season? Variable speed fans with control systems that can monitor conditions, such as temperature and humidity, will be able to adjust the speed of the fan based on the need for ventilation. If conditions allow a slower fan speed, there can be considerable savings. The energy consumption of a fan is the cube of the speed. Reducing the speed of what was a constant volume fan can result in tremendous energy dollar savings.

Workhorses: Processing Equipment

When analyzing process equipment, the three important questions are:

- *Is there a better way to accomplish the task?*
- *Are there more efficient types of replacement equipment available?*
- *Can the operating hours of the equipment be reduced?*

When the original equipment was selected, it was to meet certain specifications. If these specifications have changed over time, a different, more efficient process may be available. It's a very competitive world and equipment manufacturers are always striving to make improvements, energy efficiency being one area, to reduce your operating costs and to entice you to buy new equipment. Finally, equipment and systems are typically designed for the highest output condition. Does the equipment have the ability to operate efficiently at part load conditions?

Burning the Midnight Oil: Lighting Systems

In many agricultural operations, lighting is not a significant user of overall energy consumption. However, for some operations, particularly dairy farms, lighting can be a large portion of energy consumption. Of all of the energy efficiency measures available, lighting efficiency improvements typically have the best return on investment and lowest payback period. Fortunately, there are many new lighting technologies options to choose from. For fluorescent lighting, there have been increases in efficiency of the lamps, the ballasts, better fixture design and more choices in the lamp and ballast configuration. Compact fluorescent lamps come in different shapes, styles and wattages. And while all the excitement over the past few years in lighting has been with LED technologies, there have also been energy efficiency improvements in induction lighting, metal halide lighting, reflector design and daylighting. One can also consider using programmable lighting controls or simple time-clocks to control the hours of operation of the lighting system.

Getting into Hot Water: Hot Water Systems

Over the years there has been quite a bit of volatility in the rise and fall of diesel, propane and natural gas pricing. A hedge against future energy prices may be to analyze if a solar hot water system could meet the needs at a cost-effective price.

Down on the Farm: Energy Consumed by Offices and Housing

Offices and housing facilities typically provide energy and dollar saving opportunities in heating and cooling systems, envelope systems, lighting and water heating. Energy saving measures include: sealing leaks in the building envelope and ductwork, replacing inefficient heating and cooling systems with more efficient systems, installing programmable thermostats to only heat and cool spaces during occupied times.

Utility Company Incentives and Tax Credits

Utility Incentives. A number of Arizona utility companies offer rebates/incentives for the installation of energy efficient equipment. The most typical measures receiving rebates are lighting improvements, heating, ventilation and air conditioning replacement or system improvements, electric motor replacement and renewable energy systems. These incentives can make the decision to purchase new equipment easier by improving the return on the investment. The U.S. Department of Energy maintains the Database of State Incentives for Renewables and Efficiency. You can find information on utility rebate programs at their website: www.dsireusa.org, as well as your utility company's website.

Federal Tax Credits. The Business Investment Tax Credit provides a credit equal to 30% for solar energy, wind energy or fuel cell systems. Solar energy includes solar water heating, solar space heating and solar photovoltaic systems. There is no cap on the amount of tax credit that can be taken. The credit is available until December 31, 2016.

State Tax Credits. Arizona has the Commercial/Industrial Solar Energy Tax Credit Program. The tax credit is equal to 10% of the installed cost of the solar energy device. Some of the eligible measures include: systems designed to provide heating, to provide cooling, to produce electrical power, to produce mechanical power, to provide solar daylighting or for wind generator systems that produce electricity. The tax credit is limited to a maximum of \$25,000 for one building.



The maximum tax credit total in a single year is \$50,000 per business. The credit is available until December 31, 2018. The program is capped at \$1,000,000 in tax credits a year.

Grant Program Opportunities

The USDA's Rural Business – Cooperative Service offers the Rural Energy for America Program. This program provides loan guarantees and grant funding for the installation of renewable energy systems and for the installation of energy efficiency improvements. Agricultural producers and rural small businesses are eligible to apply. A summary of last year's program features include:

- The loan guarantees for renewable and efficiency projects range from 60 to 85% of the loan amount. The loan amounts can range from \$5,000 to up to \$25 million.
- The minimum Renewable Energy System Grant request is \$2,500 up to a maximum of 25% of eligible project costs or \$500,000, whichever is less.
- The minimum Energy Efficiency Improvement Grant request is \$1,500 up to a maximum of 25% of eligible project costs or \$250,000, whichever is less.
- The loan guarantees and grant awards can be combined as long as the combined request does not exceed 75% of total eligible project cost.

The program for this year has not been announced yet. In previous years, applications were due the end of June.

Renewable Energy Opportunities for Agriculture

From: Arizona Governor's Office of Energy Policy



Different forms of renewable energy resources have been used for centuries in the agriculture sector. Solar energy was used to dry grain. Wind energy was put to work to move water to livestock, irrigate fields, and mill grain. In the past 30 years, we have seen a tremendous increase in the use of solar energy, wind energy and biofuels. There has been an increase in both the number of systems in use and the size of the individual units. There seems to be a growing trend toward on-site generation of power for agricultural operations.

Solar Powered Water Pumping

One example of this is in the area of solar powered water pumping. In Arizona, over the past two years, through a competitive, matching grant program, the Governor's Office of Energy Policy issued grant awards toward the installation of renewable energy projects for the agriculture sector. Forty-one farms and ranches received matching funds for 51 renewable energy projects. Grant funding is providing \$885,374, while the farms and ranches are providing \$519,299, for a total project cost of \$1,404,673. In most cases, these projects use renewable energy systems to replace gasoline or diesel generators. The gasoline and diesel-powered generators are used to pump water for livestock watering, crop irrigation or direct production of electricity for farm/ranch operations. The solar photovoltaic powered water pumps eliminate the need for gasoline or diesel fuel to run the generators. The solar systems provide the energy to run the pumps. There are additional benefits from installing these solar systems. Because the grazing pastures tend to be located at very remote sites, the solar powered pumps eliminate the fuel consumption of the trucks that were needed to drive back and forth, sometimes three times a week to these sites. It eliminates the hauling of fuel to these remote sites. Wear and tear on the trucks is reduced and the labor hours to drive back and forth are almost eliminated. The use of solar for water pumping is very cost effective. These projects can have payback periods of less than two years, and typically have payback periods under five years.

Solar Water Heating

If an agricultural operation has a need for hot water, a solar hot water heating system can be used to provide the hot water, or act as a pre-heating system for high temperature or steam needs. It is especially useful if it is difficult to get energy resources to the site due to the high cost of energy or sometimes unreliable resources. Payback periods tend to be in the five to ten year range, depending on application, of course.

Wind Energy Systems

The use of wind energy in the agricultural sector is nothing new – the use dates all the way back to 200 B.C. Windmills have been used throughout the world to mill grain, drain fields and pump ground water. Over the past three decades, the evolution of the traditional windmills to wind turbines that produce large quantities of electricity have been incorporated into agricultural operations. On the whole, Arizona does not rank high as a windy state. However, there are pockets of windy areas in the state. The key is to have fairly constant wind all year round. Installing a wind turbine in these areas could provide electricity for the farm or ranch, or, as in other areas of the country, provide a revenue source for farmers and ranchers.

Biofuels

Tapping biofuels and biogas potential may be the next renewable energy expansion area in Arizona. Finding a way to grow crops and the gathering of farm waste to make ethanol is still projected to be a growth area. Pinal County has an ethanol plant where feedstock is grown locally and used in this plant. Animal waste at dairies or feedlots has the potential to be used in biogas digesters. While fairly capital intense, putting these wastes to use could help to provide an energy resource, odor control and water quality benefits.

Technical Assistance for Agricultural Customers

From: Arizona Governor's Office of Energy Policy

Over the past two years, the Arizona Department of Commerce Energy Office (which has transitioned to the Governor's Office of Energy Policy) has administered a grant program for agricultural customers. The grant program provided stimulus funding from the U.S. Department of Energy to replace gasoline and diesel powered generators with solar and wind powered water pumps. The water pumps are used primarily for livestock watering with a few crop watering applications. Awards were made to 41 customers for 51 projects. Energy Office staff gained knowledge and experience in reviewing the applications and visiting the sites for final inspections. Forty-four renewable systems have been installed and the majority of these have been visited by Energy Office staff.

Technical Assistance Opportunity

There is a tremendous opportunity to reduce the energy costs of ranching and farming operations. Gasoline and diesel fuel generators powered by a combustion engine are generally only 10 to 20 percent efficient. There is a huge loss of energy, hence a large cost to operate these generators. However, the fuel used to run the generator is not the only energy expense. There is considerable energy used in trucking the fuel to the pasture locations, and time lost by labor driving to and from the sites, along with the wear and tear on the vehicles. Replacing these generators with a renewable energy system can be very cost effective.

It is not unusual to have payback periods in the three year to ten year range.

In addition to the generators, there may be opportunities to improve the efficiency of lighting systems, motors, fans and other energy-consuming equipment used in the operations. The Energy Office has three Certified Energy Managers (CEM) on staff. With the experience gained through the grant program, and by completing course work and passing the CEM test, the Energy Office staff members have the ability to analyze the energy use and recommend solutions to reduce agricultural energy costs.

Myth

Using alternative energies like solar and wind to reduce our petroleum use will increase U.S. energy security.

Reality

Renewable technologies are also subject to import and price security concerns. The reduction of petroleum use will most likely be reduced in the domestic production, not in unstable regions. If the U.S. was able to reduce the demand for oil, the reduction in oil production would reduce the cost of oil. The suppliers would then most likely cut the production from the highest costing areas, which are mainly in North America. Some of the most expensive oil to produce comes from the tar sands in Alberta, Canada and very deep waters near the U.S. The cheaper oil production is mainly in Saudi Arabia and other areas of the Middle East.

On-Farm Energy Audit Program

From: Arizona Department of Agriculture, Agricultural Consultation and Training

Myth

It takes less energy to boil water if you start with hot water from the tap.

Reality

Basically, it takes the same amount of energy whether you use hot or cold water. If you draw hot water from the tap, you are using the water heater to heat it first. This also means it essentially costs the same amount of money for either choice.

The Arizona Department of Agriculture (ADA) has partnered with the Natural Resources Conservation Service and the Governor's Office of Energy Policy to provide On-Farm Energy Audits at no cost to producers. Energy has become a new concern with the cost of energy increasing. The first step in reducing your energy costs is to have an audit completed and see where to reduce energy use. Producers can reduce their input costs, maintain production, protect natural resources, reduce dependence on fossil fuels, and save money by conserving their energy use.

The On-Farm Energy Audit is available for any agricultural producer that uses some sort of energy on their facility. This includes farms, nurseries, concentrated animal feeding operations and ranches. An audit is an evaluation of current farm practices and procedures with recommendations to reduce energy consumption on the farm. The audit will be conducted by a professional energy auditor. The auditor will evaluate the types of energy used, pinpoint areas of misuse and demonstrate practices that can conserve energy. This provides the producer with cost-effective ways to reduce operating costs while saving energy.

If interested, contact the ADA, fill out an application and your information will be given to the auditors. There are no government regulations or requirements associated with the audit. The audit may be used for any purpose, it is your audit. It can be used to evaluate your energy use and make appropriate changes or apply for energy conservation grants.

The ADA is pleased to offer this service for agricultural producers at no cost. For more information on this program, please contact Rusty Van Leuven at (602) 542-3484 or Tiffany Ground at (602) 542-0873.



The Energy Audit Process

From: Arizona Governor's Office of Energy Policy



The purposes of the site visit are to gain an understanding of the processes that take place at your facility and to gather information on the energy uses on your property.

Preparing for the Site Visit

To make the best use of everyone's time, it is beneficial to collect some of the data prior to the actual site visit. It is helpful to have the following information prior to the visit:

- 1 A basic description of the processes on the property to give the energy auditors background information before the site visit. What happens on the property? Examples: location of the facility, number of acres, list of activities – pump water at four different locations to service 100 head of cattle, have a dairy operation with 400 cows, irrigate 100 acres of wheat, cotton, soybeans, raise poultry, grow vegetables, citrus, pecans, apples, pears, trees or grasses. Is there food processing on the site?

- 2 Information on the previous 12 months of energy consumption, including:

- **Electricity usage.** *It is helpful to have monthly data on the kilowatt-hours used, the peak demand and the monthly cost. Copies of the electric bills provide great information. What company provides the electrical service?*
- **Gasoline or diesel fuel use.** *A 12-month record of the gallons of each fuel used and a description of what the primary uses are. Pumping water, operating machinery or processes, or transportation.*
- **Natural gas or propane usage.** *A 12-month record of the quantities of each fuel used. What are the primary uses of these fuels?*
- *Are there other fuels or energy sources used, such as heating fuels, wood, solar or wind energy?*

Site Visit Walk-through Tour

During the site visit, the team will be reviewing all of the energy consuming equipment to try and determine if there are opportunities to reduce energy usage and energy costs. It is essential to have someone familiar with the entire operation conduct a tour of the site. The team will want to inventory the large pieces of energy

consuming equipment. They will review the energy usage in office operations as well as any housing on site.

Questions may include: what is the age of the piece of equipment, how many hours a year is the equipment used; what are the main uses for electricity (pumping water, powering fans, heating water, processing loads, heating and cooling, lighting, or other uses); are there generators on site? These may be candidates for replacement with renewable energy resources. Pictures will be taken to record the information.

Results: The Energy Audit Report

After reviewing the operations of the facility on the site tour and gathering energy consumption information, the energy audit team will review all of the information to determine the best opportunities to reduce energy costs.

In preparing recommendations, the team will investigate possible utility company rebates, tax credits for the energy efficiency improvements or the renewable energy projects, and any grant opportunities available for the facility. A final report will present this information and provide recommendations for energy efficiency improvements and the potential use of renewable energy resources.

Agricultural Energy Conservation Technical Help and Money Available to Save Energy and Money

From: United States Department of Agriculture, Natural Resources Conservation Service



As one of the major users of energy in the American economy, the agricultural industry is seeing affects on their own economic sustainability due to the high cost of energy inputs. As a result, producers are beginning to conserve energy and generate renewable energy in their operations. By conserving energy, producers not only receive a positive incentive in their pocketbook, but they also help reduce reliance on fossil fuels; conserving our natural resources.

Another option to obtain an agricultural energy audit is directly through the United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS). Farmers and ranchers, with the help of the USDA NRCS, can conduct energy audits and improve their overall energy efficiency. The On-Farm Energy Audit/Implementation Initiative is offered through NRCS, which provides technical and financial assistance for this purpose through the Environmental Quality Incentives Program (EQIP).

The on-farm energy audits are basically a study of energy usage, conducted for the purpose of saving energy and money. An audit normally includes a site visit by an energy professional who inspects energy-consuming processes and equipment and then prepares a report recommending changes that could reduce energy consumption or cost. The NRCS on-farm audits follow the American Society of Agricultural and Biological Engineers (ASABE) Standards for performing on-farm energy audits. There are two types of audits available and NRCS provides type two, a more detailed evaluation and report of farm enterprise energy use that considers all major activities and components that are listed in Table 1.

An Agricultural Energy Management Plan (AgEMP) is an analysis of current farm infrastructure and management with recommendations to reduce energy consumption on the farm. This plan is developed based on the information provided from the energy audit. Producers who have

had an on-farm energy audit conducted that meets or exceeds the criteria of an EQIP AgEMP may apply for technical and financial assistance to implement the audit's recommendations.

The evaluation of energy conservation activities in the AgEMP include energy used in the cultivation, protection, harvesting, processing and storage of agricultural crops and in the feeding, housing, and processing of farm animals and animal products, and wildlife enhancement activities. It also includes purchased fuels, electricity, and renewable energy sources used to perform farm activities. A plan can be developed for each farm enterprise: a livestock production system, a field crop system, and specialized non-livestock operations such as greenhouses or cold storage. This provides producers with cost-effective ways to reduce operating costs while saving energy.

The NRCS also provides "energy estimator" tools to help farmers and ranchers make energy-efficient conservation practice decisions. Energy estimators include: Animal Housing, Irrigation, Nitrogen, and Tillage. All NRCS Energy Estimator Tools can be found at <http://energytools.sc.egov.usda.gov/>.

Applications are accepted on a continuous basis. For more information about NRCS energy audits, please visit your local NRCS field office at <http://www.az.nrcs.usda.gov/contact/directory/fsccontact1.html>.

Table 1: Suggested Components within Major Activities by Farm Enterprises for Audit Assessment

Major Activity	Components	Farm Enterprises							
		Dairy	Swine	Poultry	Beef/ Veal	Field Crops	Fruit/ Vegetables	Aquaculture	Nursery/ Greenhouse
Lighting	Lamps, Timers, Sensors	X	X	X	X		X	X	X
Ventilation	Fans, Control System, Variable Drives, Humidity Control	X	X	X	X		X	X (aeration)	X
Refrigeration	Compressor, Evaporator/Chiller, Motor, Insulation	milk products		eggs			commodity	X	veg/cut flowers
Milk Harvesting	Pumps, Motors, Controllers	X							
Controllers	Master System Automation	X	X	X				X	X
Other Motors/Pumps	Types, Compressors	X	X	X	X	X	X	X	X
Water Heating	Heater, Energy Source, Insulation, Recovery, Waterers	X	X	X	X				
Air Heating/ Building Environment	Heater, Energy Source, Insulation, Recovery, Variable Drives	X	X	X	X		X		X
Drying	Energy Source Airflow (Motors/Fans), Handling Equipment					X			
Waste Handling	Collection and Dispersal Equipment/Methods	X	X	X	X			X	
Air Cooling	Energy Source, Airflow (Motors/Fans), Control Systems, Evaporative	X	X	X	X				X
Cultural Practices	Planting, Tilling, Harvesting, Engine-Driven Equipment					X	X		
Crop/Feed Storage					X	X	X	X	X
Water Management	Wells, Reservoir, Recycled	X	X	X	X	X	X	X	X
Material Handling	Equipment, Motors, Pumps	X	X	X	X	X	X	X	X
Irrigation	Motors/Engines, Pumps, Power Source					X	X		X

USDA RD: Energizing Rural Arizona

From: United States Department of Agriculture, Rural Development

Myth

Wind turbines are noisy and kill birds.

Reality

The U.S. Department of Energy states that if you stand 750 ft from a wind farm of multiple turbines the sound would be no more than that of a working refrigerator. Wind turbines kill birds, but studies for utility-scale wind machines have found that the large turbines kill less than two birds per turbine per year. Home-sized wind turbines injure far less than the large turbines so researchers do not consider the issue significant enough to study.

A drive through rural Arizona can still offer vast expanses of cotton fields, citrus orchards and lettuce rows. Recently, new structures have been popping up among the fields – solar arrays and even a wind turbine. Rural Development (RD), an agency of the United States Department of Agriculture (USDA), has been funding a record number of solar photovoltaic projects in Arizona to help those rural businesses save money and the environment. From 2008 to 2011, USDA RD funded 35 Renewable Energy for America Program (REAP) and Biofuel Producer projects, totaling nearly \$6 million in grants.

REAP provides grants for energy audits, renewable energy development assistance, and feasibility studies. It also provides funds to agricultural producers and rural small businesses to purchase and install renewable energy systems and make energy efficiency improvements. The program basically is divided into three components: Energy Audits (EA), Renewable Energy Systems (RES), and Feasibility Studies (FS).

Energy Audits. The REAP program offers grants of up to \$100,000 to entities that will conduct Energy Audits and provides technical assistance to agricultural producers and small rural businesses interested in

undertaking energy efficiency or renewable energy projects. Assistance is limited to public bodies, institutions of higher learning, and publicly owned utilities and electric co-ops, and the funds must be used to conduct energy audits or otherwise provide technical assistance. Grants are awarded via a national competition based on merit.

Renewable Energy Systems. The RES Program provides grant funds to agricultural producers and rural small businesses to purchase and install renewable energy systems or to make energy efficiency improvements to their facility.





The grants are awarded on a competitive basis and can be up to 25% of total eligible project costs. Grants are limited to \$500,000 for renewable energy systems and \$250,000 for energy efficiency improvements. Grant requests as low as \$2,500 for renewable energy systems and \$1,500 for energy efficiency improvements will be considered. At least 20% of the grant funds awarded must be for grants of \$20,000 or less.

The program is designed to assist farmers, ranchers and rural small businesses that are able to demonstrate financial need. All agricultural producers, including farmers and ranchers, who gain 50% or more of their gross income from the agricultural operations are eligible. Small businesses located in a rural area can also apply. Rural

electric cooperatives may also be eligible to apply.

Most rural projects that reduce energy use and result in savings for the agricultural producer or small business are eligible as energy efficiency projects. These include projects such as retrofitting lighting or insulation, or purchasing or replacing equipment with more efficient units. Eligible renewable energy projects include projects that produce energy from wind, solar, biomass, geothermal, hydro power and hydrogen-based sources. The projects can produce any form of energy including heat, electricity, or fuel.

For all projects, the system must be located in a rural area, must be technically feasible, and must be owned by the applicant.

Feasibility Studies. The REAP program also provides matching grants to rural small businesses and agricultural producers to help them pay for the cost of a detailed, professional, independent feasibility study of their prospective eligible renewable energy system projects. Assistance is limited to \$50,000 or 25% of the cost of the study, whichever is less. Grants are awarded via a national competition based on merit.

For more information on USDA RD's energy programs, visit www.rurdev.usda.gov/az/ and select Energy Programs, or call our Arizona State Office Business Programs staff at (602) 280-8738.

Alan Stephens
USDA Rural Development
State Director

Energy Audits in Agriculture

From: Arizona Farm Bureau



In agriculture, our energy costs are distributed throughout our operating statements in a variety of expense categories. As such, the fact that we are an energy intensive industry is often disguised. We certainly feel it when we pay for the most recent shipment of diesel fuel, but we don't always see it when we pay our other expenses.

At the same time we also focus on logistics, timing and fine tuning our production, and since energy costs may not be the focus, we can easily be spending more than we need. Maximizing the bottom line is always the key. Now that you have thought about it, help might be on the way. Even better, it is a no-cost program to the producer and there is no hidden sales agenda – there is not even a sales pitch – just a report as to how you might save some money!

The Arizona Department of Agriculture through the United States Department of Agriculture, Natural Resources Conservation Service is offering energy audits for your operation. They will visit your operation, audit your energy use and provide a report specific to your operation and available to you. You may find many ways to save on

your energy costs, while improving your bottom line.

The only disclaimer is like the weight loss commercials: “...everyone's experience is different – your cost savings may not be representative of another...” It's also akin to having someone point out the obvious, but as we busy ourselves with our businesses, sometimes the obvious can escape us and sometimes things are only obvious after they have been pointed out to us.

Unlike most sales pitches, you really have nothing to lose with this program – there is only an upside. Please give it a try.

Joseph Sigg
Director of Government Relations,
Arizona Farm Bureau

This is Too Good to Pass Up!

From: Arizona Cotton Growers Association



Anytime I hear about something that is free, I naturally get very skeptical, but not this time.

In a cooperative arrangement with United States Department of Agriculture, Natural Resources Conservation Service and the Arizona Department of Agriculture, Agricultural Consultation and Training Program (ADA, ACT), you can have your farm energy process “audited” to determine efficiency.

The process is very simple. You call ADA, ACT and arrange for an on-site visit by an energy professional that will inspect your system and then give you a report recommending any changes that could reduce energy consumption.

So, if you are interested, call (602) 542-3484 or (602) 542-0873 at the ADA to arrange for your free audit.

Rick C. Lavis
Executive Vice President,
Arizona Cotton Growers Association

Myth

Leaving a light on uses less energy than turning it off and on several times.

Reality

When using a compact fluorescent light (CFL), it should be left on if it will be needed for use again within fifteen minutes. The life of a CFL will be shortened if it is switched on and off frequently. If an incandescent light is left on it does use more energy than if it is turned on and off as needed.



Raising Cattle Utilizes Energy Too

From: Arizona Cattlemen's Association



In the ranching industry, we rely on the energy of the sun and rain to produce the grass we all harvest to grow our cattle. Mother Nature plays a big role in our business, but what about those aspects we have control over, like fuel consumption, water use and other costs?

A majority of ranching operations energy use is in the fuel they burn for vehicles, equipment and wells. In fact, how much energy does your ranch use?

The Arizona Department of Agriculture has a cooperative agreement with the United States Department of Agriculture, Natural Resources Conservation Service to offer energy audits for your operation. They will visit your operation, audit your energy use and provide a report specific to your operation and available only to you. You may find many ways to save on your energy costs, while improving your bottom line.

As a result of the audit, a plan can be developed for your individual ranch which will ultimately provide producers with cost-effective ways to reduce operating costs while saving energy. The Arizona Cattlemen's Association is pleased to work with the Arizona Department of Agriculture to provide this type of an opportunity for the ranching community. It is time for you to start looking at what you can do to help your bottom line.

Patrick Bray
*Executive Vice President,
Arizona Cattlemen's Association*

Opportunity for Nurseries to Conserve Energy and Save Money

From: Arizona Nursery Association



Although we are seeing a few good trends out there for the nursery industry, any way you can save money as a nursery operator is always a good thing. Rising energy costs can eat into profits for nurseries. Investigating ways to conserve energy or utilize renewable energy sources in your operation might be the key to saving money for you in the coming years.

The Arizona Department of Agriculture's Agricultural Consultation and Training (ACT) Program has announced a new cooperative arrangement with the United States Department of Agriculture, Natural Resources Conservation Service to provide an energy audit for your nursery with the goal of improving your overall energy efficiency. The on-farm energy audits are basically a study of energy usage, conducted for the purpose of saving energy and money. An audit normally includes a site visit by an energy professional that inspects energy-consuming processes and equipment and then prepares a report recommending changes that could reduce energy consumption or cost. As a result of the audit, a plan can be developed for each nursery which will ultimately provide producers with cost-effective ways to reduce operating costs while saving energy.

The Arizona Nursery Association (ANA) has a very good working relationship with the ACT Program at the Department of Agriculture, and ANA is excited they have added a new component which will be useful to our nurseries. For many years, the program has assisted with pesticide requirements and air quality issues. The new energy program comes at a good time for our industry. ANA encourages nursery operators to take advantage of this new program by contacting the ACT office at (602) 542-3484 or (602) 542-0837.

Cheryl Goar
Executive Director,
Arizona Nursery Association

Myth

Energy conservation and energy efficiency mean the same thing.

Reality

Energy conservation means to reduce the level of energy services needed where energy efficiency means to complete a job while using less energy.





Energy Audits Make Sense for Dairies

From: United Dairymen of Arizona

Myth

We must import large quantities of oil and natural gas.

Reality

The U.S. could expand its domestic production and greatly reduce imports. The Bureau of Land Management has estimated that the U.S. energy supplies are 117 billion barrels of oil and 651 trillion cubic feet of natural gas, on and off shore. It would be possible to replace our Organization of Petroleum Exporting Countries (OPEC) imports of oil for more than 50 years and enough natural gas for over 30 years. Currently, the Federal lands with the most significant domestic amounts of crude and natural gas are closed off to leasing, which means 41% of the natural gas and 62% of available oil is inaccessible.

Business people like to reduce two things: cost and uncertainty, especially when the uncertainty overlaps with potential higher costs. Dairy producers who may be looking at another year of milk price volatility have a very powerful reason to consider having an energy audit conducted on their dairy.

"I'm hoping to gain some insights about where I can save money," said Kelly Moss. "If I can have an energy audit done at no cost to me, and information from the audit can help me reduce energy costs, I definitely want to pursue it."

Milk prices are not the only volatile item in the market place; energy costs also fluctuate as a result of numerous factors, some within human control, some not. "It seems to me that having an energy audit would simply give me more information with which to make management decisions," continues Kelly. "I want to be proactive where I can, and this would be one area where I can potentially reduce both the costs and the level of unknowns."

Energy costs are typically not in the top five dairy expense categories – but they are in the top ten, according to both Genske Mulder and Company, and Frazer Certified Public Accountants and Consultants. And so it makes sense to use opportunities to reduce those costs. An energy audit is the first step in doing that.

Producers who anticipate applying for funds or grants from Salt River Project (SRP), Arizona Public Service or the United States Department of Agriculture (USDA) for solar or other energy reduction technologies will find that having an energy audit performed by a Qualified Service Provider is sometimes a requirement, and if not, is at least a valuable addition to the application process.

Robert Van Hofwegen, of Paloma Dairy in Gila Bend, used a similar logic when they had a water conservation audit done several years ago. "By really scrutinizing our land and the water use in our dairying and farming operations, we were able to make decisions and major investments knowing that they would pay off." The advantage of an energy audit over a water use audit is its expanded application. Robert observed that reducing energy costs is possible even on a leased operation, whereas the infrastructure for water conservation is typically more practical for a dairy owner. "I'm definitely interested in having an energy audit done," he said.

Zimmerman Dairy has recently occupied a "solar-powered spotlight," given their new solar installation which now produces approximately 60% of the energy required to run their dairy. "Having an energy audit done was a requirement for us to pursue getting the grants from SRP and from USDA," said Bill Zimmerman. They used a Qualified Service Provider who toured the dairy, inspected equipment, reviewed five years of utility bills to evaluate the usage rates, discussed his observations, and then made recommendations. "The really big plus in doing an energy audit was how clear it made the decision to move forward on our solar project," said Vickie Zimmerman. "Once we looked at the amount of energy we were using, and could reasonably expect to use over the next several decades, pursuing the solar project made sense, especially with the energy price projected to increase by 50% by 2020." And then she added "We want to do another one, because we think there are still places where we could be more efficient."

*Frances Lechner
Member Relations Manager,
United Dairymen of Arizona*

On-Farm Energy Audit Implementation Program

Agricultural Energy Audit Request

Arizona Department of Agriculture, Agricultural Consultation and Training

Date of Request			Person Making Request		
Full Company Name			Contact Person		
Owner(s) Name(s)					
Address			Physical Location		
County			Phone		
Fax			Cell		
Email					
Farm	Ranch	Nursery		Dairy	Feedlot
Acres	Acres	Wholesale	Retail	AU	AU
General Description of Operation. Describe the Types of Processes. <i>Example: plant and harvest crops, process vegetables, etc.</i>					

General Description of Buildings and Their Uses				
Description of the Large Energy Users. <i>Example: electricity to run irrigation pumps or ground water pumps, ventilation fans, heat water, lighting, refrigerating milk or produce, to run air compressors, heating and cooling buildings, natural gas to power water pumping, fuel for trucks, etc.</i>				
12-Month Electricity Costs	12-Month Propane Costs	12-Month Diesel Fuel Costs	12-Month Natural Gas Costs	12-Month Other Energy Costs
Company	Company	Company	Company	Company

Fax completed Audit Request Forms to:

602.364.0830 (Attention: ACT - OFEAIP)

or

Mail completed Audit Request Forms to:

Arizona Department of Agriculture
On-Farm Energy Audit Implementation Program, Attention: ACT
1688 West Adams Street, Phoenix, Arizona 85007

Tiffany H. Ground: 602.542.0873
Rusty Van Leuven: 602.542.3484





The Agricultural Consultation and Training Program is an innovative compliance assistance program unique to an agricultural regulatory agency.

This program embraces the Arizona Department of Agriculture's (ADA) goal of encouraging farming, ranching and agribusiness, while protecting consumers and natural resources by utilizing a non-enforcement approach. ACT is not affiliated with any of ADA's enforcement programs, allowing staff members to provide a formal means by which the regulated agricultural community may request compliance assistance without regulatory intervention. Agricultural Consultation and Training serves Arizona's diverse agricultural community by promoting agriculture, conducting training, increasing voluntary compliance and awareness of regulatory requirements and providing agricultural conservation education through compliance assistance and education programs.



Arizona Department of Agriculture

Agricultural Consultation and Training

On-Farm Energy Audit Implementation Program

1688 West Adams Street, Phoenix, Arizona 85007
Fax: 602.364.0830 (Attention: ACT - OFEAIIP)

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